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March 8, 1948

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TIMBER MANAGEMENT

INYO

Owens River Working Circle

REVISION OF

TIMBER MANAGEMENT PLAN

THE OWENS RIVER WORKING CIRCLE

INYO NATIONAL FOREST

TRANSFERRED

TIMBER MANAGEMENT

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PLANS, R-5
Timber Management
INYO
Owens River Working Circle

Bishop, California
March 8, 1948

REVISION OF
TIMBER MANAGEMENT PLAN
THE OWENS RIVER WORKING CIRCLE
INYO NATIONAL FOREST

Respectfully submitted:

Fred W. Ahrenholz
Forester

Approved: March 10, 1948

Floyd Louison
FOREST SUPERVISOR

Approved: _____, 1948

Assistant Regional Forester
Division of Timber Management

Reviewed by Regional Office Divisions:

Engineering _____
Fire Control _____
Range Management _____
Recreation and Lands _____
State and Private Forestry _____
Wildlife Management _____

Approved: _____, 1948

Regional Forester

Approved: _____, 1948

Chief, Forest Service

T A B L E _ O F _ C O N T E N T S

Page

FOREWORD

SUMMARY

FOUNDATION	1
Introduction	1
Purpose	2
Physical Features	2
Location	2
Boundaries	3
Topography	3
Soil.	3
Climate	3
Types	3
The Jeffrey Pine Type	3
The Red Fir Type	3
The Lodgepole Pine Type	4
The Mixed Types	4
Blocks	4
The Mono-Owens Block	4
The Glass Mountain Block	4
The Round Mountain Block	4
Fire	5
Land Classification	5
Land Ownership	6
Volume Estimates	6
Growth and Yield	7
Social-Economic Features.	8
Timber Use Values of the Working Circle	8
Communities and Their Relation to the Working Circle	9
Local Manufacturing and Timber Consuming Capacity	9
Local Industries	10
Timberland Ownership	10
THE MANAGEMENT PLAN.	11
Objectives	11
Silvicultural Measures by Individual Areas	11
The Merchantable Sawtimber Producing Area	11
The Semi-Merchantable to Unmerchantable Sawtimber Production Area	13
The fuelwood Producing Area	13
The Recreation Areas	13
The High Sierra Wilderness Area	13
The Indiana Summit Natural Area	13
The Mammoth-Rock Creek Recreation Area	14
The Highway Scenic Strip Area	14
The Upper Owens River Recreational Area.	14
Regulation	15
The Rotation	15
The Cutting Cycle	15
The Allowable Cut	15

TABLE OF CONTENTS

	Page
Regulation Policy	15
Sales Policy	16
The Cutting Budget	16
Administrative Correlation	16
Acquisition and Exchange	16
Grazing	17
Recreation	17
Road Development	17
Fire Protection	17
Wildlife and Game Management	17
Water Power Development and Watershed Protection.	18
 APPENDIX	 19
Detailed Timber Estimates by Townships	19
Growth Data	19
Opinions and Conjectures	22

FOREWORD

This Management Plan is essentially the same as that previously submitted by Louis R. Geil on May 8, 1947. Minor revisions and corrections have been made throughout the plan. The Reds Meadow Block has been eliminated as it is part of the Sierra Forest and it is also not a logical part of the Working Circle as it is across the Divide. This Plan cannot be considered the final revision for the Working Circle, however, it does state the policy and would be on record as a guide for managing the timber stands on the Working Circle. It is the plan of the Inyo Forest to continue gathering data, i.e., complete cruising unallocated areas, establish permanent plots, check acreages, etc., so that a revision based on sound statistics can be made at an early date.

S U M M A R Y

Total Acreage

	<u>Revised Plan</u>	<u>Original Plan</u>
Timbered acres allocated,		
Government	43,340	
Private	9,660	
Total	53,000 ✓	45,000
Unallocated	57,000	
Sub-total	110,000	45,000
Non-timber use, acres	288,000	31,000
Total	398,000	76,000
Merchantable Volume, M feet b.m.		
Government	281,860 ✓	564,000
Private	27,250	51,000
Total	309,110	615,000
Rotation	Multiple	140 years
Cutting Cycle	20 years	70 years
Silvicultural method	Risk and modified selection	Heavy selection
Allowable annual cut MM feet b.m.	6.0	7.0
Estimated 2nd cut per year MM feet b.m.	4.0	3.5
Unallocated timber MM feet b.m.	235 ✓	
Allowable annual cut MM feet b.m.	6.0	

281.6
235
516.6

FOUNDATION

INTRODUCTION

A Management Plan for the Mono Lake - Owens River Working Circle was prepared by John S. Barnes and approved in the spring of 1923. Physical and economic changes have developed in this area during the 23 year period subsequent to the preparation of this plan. Major changes reflected in the present revision of this plan are as follows:

1. Heavy loss of merchantable timber from the Working Circle by windstorm and insect infestation during the period 1922 to 1927.
2. A reduction in the volume of merchantable old growth timber within the Working Circle due to harvesting of timber resources during the past 23 years.
3. New estimates of merchantable timber within the Working Circle and re-determination of merchantability boundaries based on a more intensive survey completed by Earl Thomas and party in 1944.
4. Changes in ownership, capacity, and location of lumber producing industries dependent upon this body of timber.
5. A decided decrease in the forecasted local demand for timber products.
6. A steady increase in recreational use on portions of the timbered area within the Working Circle.
7. Changes in the economic conditions and in logging methods which make economically feasible a lower volume per acre cut and therefor a shorter cutting cycle.
8. Subsequent silvicultural studies and findings applicable to this body of timber.
9. Progress toward the completion of a land exchange agreement; therefor, this revision of the 1923 Management Plan for the Mono Lake - Owens River Working Circle recommends the following changes:
 - a. Changing the name to the Owens River Working Circle.
 - b. Changing the boundaries to include the Mono-Owens, Glass Mountain, and Round Mountain Blocks.
 - c. Changing the area to include 122,000 acres of recreation and allied use land, 121,000 acres of non-timbered land, 65,000 acres of woodland type, 71,000 acres of unallocated sawtimbered land, 14,400 acres of young growth sawtimbered land, and 38,600 acres of virgin sawtimbered land.

- d. Providing for primary timber use and compatible secondary uses by individual areas.
- e. Acceptance of the recent Thomas and party cruise which indicates the following total volume of sawtimber on 38,600 acres of virgin allocated sawtimber land within the Working Circle:

Jeffrey Pine	246.3 MM feet, b.m.
Western White Pine	1.7 MM feet, b.m.
White Fir	4.9 MM feet, b.m.
Red Fir	56.2 MM feet, b.m.
Total	<u>309.1 MM feet, b.m.</u>

- f. Changing the first cutting cycle from 70 years as of 1923 to 20 years as of 1946.
- g. Lowering the average annual allowable cut from 7 MM feet, b.m. to 6 MM feet, b.m. of allocated timber.
- h. Changing the cutting practice from a heavy cut to a lighter cut on all merchantable types for the first cutting cycle.
- i. Placing timber cutting on a sustained yield basis after the first cutting cycle. This sustained yield is estimated at approximately 4 MM feet, b.m. per annum.
- j. Removing the restriction on shipment of timber products outside the dependency area, set up in the 1923 Management Plan.

PURPOSE

It is the purpose of this plan to set forth and provide for the fulfillment of those management practices which, in conformance with Regional and Forest Policy, may best be expected to produce from timberlands of the Owens River Working Circle the maximum continuous flow of goods and services for public consumption. This can best be accomplished when the major objectives of timber management for the Working Circle are observed. These objectives are:

1. To salvage the defective and poor risk timber at as rapid a rate as is practical, thereby leaving the stands in a good growing condition.
2. To put the rate of cutting on a sustained yield basis after the area has been placed in a good growing condition.
3. To increase the quality and rate of timber growth.
4. To provide continuous local employment and community stability to the greatest extent possible.

PHYSICAL FEATURES

Location: The Owens River Working Circle is located between the White Mountain range on the east and the Sierra Nevada Mountain range on the west. It includes the timbered lands on the east side of the Sierra Nevadas draining north into

Mono Lake, south into the Owens River and the headwaters of Adobe Creek and Black Canyon draining northeast into Adobe Valley, all within Mono County, California.

Boundaries: The Working Circle is bounded on the north, east, and south, by open desert lands and on the west by the high, barren, rocky peaks of the Sierra Nevada Mountains.

Topography: The topography of this area is in general smooth to rolling hills with occasional abrupt outcrops of igneous rock. Stream courses are shallow gulches over the major portion of the better-timbered areas. The timber lies at elevations of from 7,000 to 9,000 feet.

Soil: The soil of this region is a light loose pumice sand of volcanic origin. This soil is very porous, subject to rapid evaporation, and capable of absorbing large quantities of flash precipitation. The soil in general is not subject to destructive water erosion even on steep open slopes.

Climate: Precipitation on the Working Circle comes largely during the winter months almost entirely in the form of snow. The average snowfall is from four to six feet. Winters are severe and summers mild.

Rapid evaporation in this loose porous soil together with the low average annual precipitation for this area forms the critical environmental factor limiting timber growth and natural reproduction.

Types: The Working Circle is composed of three distinct pure types with transition zones of mixed types between the pure types. Pure types in order of their commercial importance are Jeffrey pine, red fir, and lodgepole pine. Mixed types include in varying amounts the following species: Jeffrey pine, white fir, red fir, lodgepole pine, and western white pine.

1. The Jeffrey Pine Type: This type averages 90% Jeffrey pine and contains from 1% to 20% of combinations of white fir, red fir, and lodgepole pine. It occurs at elevations from 7,000 feet to 9,000 feet on the drier portions of the Working Circle. Stands of this type contain from 3 to 15 M feet b.m. per acre and average approximately 8.5 M feet b.m. per acre on merchantable portions of the type. The type is composed of open grown low quality, limby fast tapering trees. Mature trees average 34 inches in diameter breast high and 90 to 110 feet in total height. Reproduction is poor under mature stands. There are, however, areas well-stocked with young growth in old cut-over or wind-thrown stands. Damage from insects is evident throughout the type. The last insect infestation of epidemic proportions occurred during the period 1925 to 1927. This infestation followed a heavy wind-storm. The insect loss during this three-year period was estimated to exceed 13 MM feet b.m.
2. The Red Fir Type: This type averages 90% red fir. Associate species composing 1% to 20% of this type are white fir, Jeffrey pine, lodgepole pine, and western white pine. The type occupies the better sites on northerly and easterly slopes at lower elevations and all exposures at higher elevations. It occurs at elevations from 8,000 to 9,000 feet. Mature trees average 38 inches in diameter at breast height and from 100 to 130 feet in height. Maximum for this species is 74 inches in diameter breast height and 175 feet in height. Mature stands of this type have a high percentage of defect. Shake often extends throughout a major portion of the bole of

large mature trees and may or may not be indicated externally in the form of frost cracks. The average gross volume per acre for this type is considerably greater than that for the Jeffrey pine type. Small areas of the red fir type exceed 30 M feet b.m. per acre. Reproduction is better than in the pine type and little difficulty in securing reproduction is anticipated.

3. The Lodgepole Pine Type: This type averages about 95% lodgepole pine by number of stems 8 inches and over, diameter breast height. Associate species composing 1% to 20% of the stand by number of stems are Jeffrey pine, white fir, red fir, and western white pine. The type occurs at elevations of 7,500 feet to 8,500 feet on poorly drained sand flats and stream courses. The trees are small, short, and have little clear length over a major portion of the Working Circle. The species is at present commercially valuable locally only for posts, poles, and fuelwood. Neither the acreage nor the volume of this type has been included within the merchantable allocated computations for the Working Circle.
4. The Mixed Types: Mixed types within the Working Circle include Jeffrey pine-white fir, Jeffrey pine-red fir, Jeffrey pine-lodgepole pine, white fir-red fir, red fir-white fir, red fir-Jeffrey pine, red fir-lodgepole pine, red fir-western white pine, lodgepole pine-Jeffrey pine, lodgepole pine-red fir, lodgepole pine-western white pine, western white pine-red fir, western white pine-lodgepole pine, and other admixtures of the above species. Those mixed types containing a large percent of Jeffrey pine are commercially the more important mixed types. Western white pine occurs at higher elevations in admixture with other species and is not extensive enough to warrant special consideration.

Blocks: The Working Circle has been divided into four blocks for management purposes. These blocks are:

1. The Mono-Owens Block: This block contains all of the timber of the Working Circle that is considered as commercial sawtimber merchantable at the present time. This block is practically identical to the Mono Lake-Owens River Working Circle as defined in the 1923 management plan and is commercially the most important block. This block includes those timbered lands draining north into Mono Lake and those timbered lands draining south into the headwaters of the Owens River. This block is the major present consideration of this management plan.
2. The Glass Mountain Block: This block includes all timber producing lands draining northeast into Adobe Valley. The timber of this block is semi-merchantable to unmerchantable. It includes Jeffrey pine, lodgepole pine, and pinion pine types. The volume per acre of sawtimber varies from 2 M feet b.m. to 5 M feet b.m. per acre. Topography, transportation facilities, and volume per acre are not as favorable as on the Mono-Owens block. A small part of this block was logged in the early mining days. At present the timber of this block is valuable largely for posts, poles, and fuelwood. The block has limited potential commercial sawtimber possibilities.
3. The Round Mountain Block: This block includes an isolated body of poor quality, low per acre volume of pure Jeffrey pine. The block includes all timber producing land south and east of Crowley Lake. The block is classi-

fied as semi-merchantable unallocated sawtimber. Volumes vary from 2 M feet b.m. to 5 M feet b.m. per acre. Mature trees average 28 to 30 inches in diameter breast height and 50 to 60 feet in height. The block has limited commercial sawtimber possibilities.

Fire: Fire has not played a major destructive role in the Working Circle. This fact may be credited to the following factors:

1. Timber stands are relatively open with little undergrowth. In general there is little inflammable material on the ground. Bare pumice sand flats and areas of scattered sagebrush with bare sand openings break the stands into small blocks.
2. The dangerous fire season in this area is of a very short duration. Snow is usually late leaving the area and returns early in the fall.
3. Steep slopes with flashy fuels are practically non-existent in this area. Steep slopes are usually bare rock which are barriers to fire.

Major factors which can reasonably be expected to contribute to future destructive fires and which deserve consideration are:

1. Commercial sawtimber cutting will materially increase the amount and extent of flash fuel on the ground.
2. Moderate westerly winds throughout the fire season are characteristic of the Working Circle. Occasional high winds hit this area during the fire season.
3. The steady increase in recreational use in areas adjacent to logging offers an ever-increasing fire risk.
4. Values of both natural resources and improvements on adjacent recreational areas are continually increasing. Increased protection and hazard reduction consistent with this increased value is therefor justified.

Land Classification: The Working Circle is classified into land use groups as follows:

Land Classification by Blocks in Areas

includes private.

Block	Total Area	Recreation Area	Non-timbered Area	Woodland Area	Sawtimber Area		
					Unalloc. Sawtimber	Alloc. Young Growth	Alloc. Virgin
Mono-Owens	227,000	122,000	32,000	1,000	19,000	14,400	38,600
Glass Mtn.	110,000	--	35,000	51,000	24,000	--	--
Round Mtn.	61,000	--	34,000	13,000	14,000	--	--
Total	398,000	122,000	101,000	65,000	57,000	14,400	38,600

Recreation areas include wilderness areas, highway scenic strips, areas of high recreational values and the Indiana Summit Natural Area.

Woodland areas are those timbered areas valuable for timber products such as posts, poles, and fuel wood. Pinion pine is the important species of this type.

Non-timbered lands include barren lands, grazing lands and agricultural lands.

Unallocated sawtimber areas include stands of sawtimber which are semi-merchantable or unmerchantable because of volume, quality, inaccessibility or unmerchantability of the species.

Allocated sawtimber areas include stands of virgin sawtimber which are merchantable upon maturity.

Land Ownership: The attached map shows the ownership of lands included in the Working Circle. Ownership of the sawtimber producing lands not included in recreation areas within the Mono-Owens Block is as follows:

Ownership	Young Growth in Acres	Virgin in Acres	Total in ACRES
Private	7,020	2,640	9,660
Government	7,380	35,960	43,340
TOTAL	14,400	38,600	53,000

Volume Estimates: Volume estimates herein used are based upon a ten percent cruise of merchantable sawtimber within the Mono-Owens Block, and a five percent cruise of sawtimber within the Round Mountain Block all completed in 1944. Volume estimates for all other bodies of timber are based upon average volume per acre ocular estimates. These estimates are crude but represent the best information available at present.

Volume estimates of the merchantable-virgin, allocated sawtimber within the Mono-Owens Block are as follows:

Allocated Volume by Species in MBM

Item	Acreage	J.P.	W.W.P.	W.F.	R.F.	TOTAL
Government Allocated						
Virgin	35,960	219,020	1,700	4,940	56,200	281,860
Olcese Estate						
Virgin	2,550	26,520	--	--	--	26,520
Other Private						
Virgin	90	730	--	--	--	730
TOTAL	38,600	246,270	1,700	4,940	56,200	309,110

The total timber resources for the Working Circle are estimated as follows:

(continued on next page)

	MM feet b.m.		:MM feet b.m.		:Woodland in		:
	Merchantable		:Semi to Unmer.		: M Cords		:Xmas
	Sawtimber		: Sawtimber		:		:Trees
	Recreation	Non-Recreation:	Recrea. Non-Recrea.:	Recrea. Non-Rec.:			:
BLOCK	Areas	Areas	: Areas	Areas	: Areas	Areas	:
Mono-Owens	59	309	: x	51	: 30	4	: x
Glass Mtn.	--	--	: --	50	: --	193	: --
Round Mtn.	--	--	: --	34	: --	39	: --
TOTAL	59	309	: x	135	: 30	236	: x

x No estimate available at present.

Growth and Yield: Growth studies applicable to the merchantable timber types of this Working Circle are very meager. A study of increment borings of 335 trees was made in 1923. A summary of that portion of this study dealing with the average Jeffrey pine site for the merchantable timber of the Working Circle is given on page 20 of the 1923 Management Plan. Application of this data to 45,000 acres of timberland (page 8 of the 1923 Management Plan) indicated an average net growth of 3,500 M board feet per year for the 45,000 acres considered.

A study of increment borings of 269 trees was made on eleven one acre plots in 1945 on the old Hess cutover. This included eight plots of Jeffrey pine type with an average site index at age 300 years of 101 and three plots of Jeffrey pine-fir type with an average index of 115. The eleven plots averaged at the time of cutting 17 M feet b.m. per acre total net stand, 15.1 M feet b.m. per acre cut and 1.9 M feet b.m. leave. The period of growth averaged 20 years.

Results of this study indicate the following:

Average gross growth per acre per year, J.P. type-76.0 bd. ft.
Average losses per acre per year, J.P. type - .3 bd. ft.
Average net growth per acre per year, J.P. type -75.7 bd. ft.
Average gross growth per acre per year pine-fir type - 206.2 bd.ft.
Average losses per acre per year,pine-fir type - 35.7 bd.ft.
Average net growth per acre per year pine-fir type -170.5 bd.ft.

On the basis that the sample area was approximately average for the Working Circle as a whole and on the basis that the average leave on the Working Circle as a whole will exceed the 1.9 M feet b.m. per acre on the sampled plots, and on the assumption that a greater leave per acre will increase the average growth and average loss per acre, then the above growth data can be applied to the merchantable sawtimber producing lands with some conservatism. Average annual growth for a twenty-year period following simultaneous cutting of the area would then approximate the following:

(continued on next page)

Average Annual Growth

Item	Gross Growth per A.	* Losses per A.	Net Growth per A.	Acreage	Total Gross Growth	Total Losses	Total Net Growth
Gov't							
J.P. type	76 ft.	15 ft.	61 ft.	34,840	2,648 M	523 M	2,125 M
Gov't							
J.P.-fir & fir types	206 ft.	41 ft.	165 ft.	8,500	1,751 M	348 M	1,403 M
Gov't							
Total or Average	101 ft.	20 ft.	81 ft.	43,340	4,399 M	871 M	3,528 M
Private							
J.P.type	76 ft.	15 ft.	61 ft.	9,660	734 M	145 M	589 M
Total or average Gov't plus private	97 ft.	19 ft.	78 ft.	53,000	5,133 M	1,016 M	4,117 M

* Losses have been increased to 20% of gross growth.

It will be noted that both the above growth studies conservatively indicate an annual net growth following cutting of approximately 3,500 M feet b.m. for the government owned merchantable sawtimber producing lands of the Working Circle. The 1923 Management Plan indicates an expected ultimate net growth of 5,400 M feet b.m. per year on government land and 1,000 M feet b.m. net growth per year on private land for the merchantable sawtimber lands of the Working Circle.

SOCIAL - ECONOMIC FEATURES:

Timber Use Values of the Working Circle: The present greatest value of timber within the Mammoth Creek, Sherwin Creek, Laurel Creek, Convict Creek, McGee Creek, Hilton Creek, and Rock Creek drainages and on the highway strip bordering U.S. Highway #395, is that of recreational, aesthetic, and photogenic use. Considering the ever-increasing demand on this form of timber use in these areas, other timber uses compatible with this primary use are extremely limited. Cutting of timber within these areas would therefor logically be confined to (1) Control measures necessary to insure adequate protection of the stand and (2) Salvage measures compatible with this primary high value use.

Areas of potential high recreational, aesthetic, photogenic, and research value include the Indiana Summit Natural Area, Deadman Creek, and Upper Glass Creek. Timber cutting within these areas will logically be confined to (1) control measures necessary to insure adequate protection of the stand, (2) salvage cutting compatible with the primary highest value use, and (3) harvesting of timber resources which will not appreciably contribute to the anticipated future primary use.

Areas with little potential timber use value other than sawtimber production and minor timber products production include the Round Mountain Block, the Glass Mountain Block, and in general the remaining portions of the Mono-Owens Block. Timber cutting within these areas will logically include those cutting practices which will best insure the greatest net yield of timber products.

Communities and Their Relation to the Working Circle: Communities partially dependent upon resources of the Working Circle as a source of goods and employment include:

1. The City of Bishop: This community at present derives from the Working Circle employment for approximately 50 sawmill and box factory workers and approximately 30 woods workers. Business establishments are partially dependent upon recreational and tourist trade of the area as a market for their products and services. The major portion of lumber, posts, poles, fuel wood, Christmas trees, and other minor forest products consumed locally are from the Working Circle.
2. The Leevining Community: This small community is partially dependent upon this Working Circle as a source of recreational and tourist trade and as a source of minor forest products.
3. The June Lake Community: This Winter and Summer recreational dependent community derives a small portion of its trade from recreational use upon the Working Circle. In addition, the Working Circle is the major source of minor timber products.
4. The Mammoth Lakes Community: This community is entirely dependent upon recreational use within the Working Circle. Use includes summer homes, camping, picnicking, fishing, swimming, hunting, hiking, horseback riding, and practically all forms of both summer and winter outdoor sports. Use during the 1945 season exceeded and estimated 130,000 forest visitors. The Working Circle is the major source of fuel wood, posts, poles, and other minor forest products for this community.
5. Other Owens Valley Communities: The Working Circle contributes, in addition to the above, considerably toward the support of other communities in the Owens Valley largely in the form of recreational and tourist trade and in minor forest products.

Local Manufacturing and Timber Consuming Capacity: The major manufacturing plant in this area is the Inyo Lumber Company saw-mill and box factory located near Bishop. This three year old electric mill has a capacity cut of 15 MM feet b.m. per year on the basis of an 8-hour per day shift. This is the only existing, wood using, manufacturing plant dependent upon the Working Circle. Approximately one year of capacity cut from privately owned timber remains for this plant.

The consumption of lumber within the Mono Lake-Owens Valley area was abnormally low during the war years, averaging approximately 2 MM feet b.m. per year. Practically the entire output of the local mill was shipped to the Los Angeles market. Local consumption of lumber is expected to more than double this wartime average for the next few years.

Minor forest products including fuel wood, posts, and poles, taken from the Working Circle has averaged approximately 500 M feet b.m. per year for the past few years. Local use of these products can be expected to show some increase for the next few years.

The local demand for Christmas trees averages approximately 2,000 trees per year.

Local Industries: The major industries of the Mono Lake - Owens River area are water and power production, livestock production, agriculture, and recreation. Minor industries include mining, soda and potash production, and lumbering. Agriculture in general and the fruit industry in particular declined drastically at the time the City of Los Angeles secured the water of the Owens Valley. As a partial offset to the decreased lumber demand for agriculture, there has been a steady increase in summer home and resort construction in the Mammoth Lakes, Mono Lake, and other recreational areas.

Timberland Ownership: There is but one tract of privately owned merchantable timber of major importance from a timber management point of view within the Working Circle. This tract of approximately 10,000 acres is at present in the process of changing to Government ownership through a precutting land exchange agreement with the Inyo Lumber Company. This tract, known as the Olcese Estate, represents approximately 18 percent of the sawtimber producing land of the Mono-Owens Block.

In addition to the Olcese Estate, there are scattered small tracts of privately owned timbered lands within the Working Circle valuable to the government largely from a recreation management or range management standpoint.

Lands owned by the City of Los Angeles are of minor importance from a timber management standpoint.

THE MANAGEMENT PLAN

OBJECTIVES

The objectives of timber management of the Owens River Working Circle are:

1. To harvest defective timber as rapidly as is practical.
2. To subsequently harvest timber on a sustained-yield basis.
3. To increase the quantity and quality of timber growth.
4. To provide continuous employment and community stability.

SILVICULTURAL MEASURES BY INDIVIDUAL AREAS

The Merchantable Sawtimber Producing Area: This is the allocated sawtimber producing portion of the Working Circle and is entirely within the Mono-Owens Block. The specific boundaries of this area are those shown by the Thomas and party cruise of 1943 and 1944 with the recreation areas excluded. The general exterior boundaries are shown on the attached map.

The guiding major objectives of cutting this area will be that of harvesting the timber that is dead, defective, or immediately susceptible to loss and that of leaving cut-over areas in the best possible timber producing condition. The present primary timber use of this area is that of commercial lumber production. Secondary timber uses include use of logging refuse for fuelwood, posts, etc., the cutting of Christmas trees, and other minor uses compatible with the primary use. Cutting of timber will be on a poor risk basis for the first cutting cycle. Merchantable dead trees, defective trees, poor insect-risk trees, and poor mechanical-risk trees will be marked for the first cut. When additional volume is needed to make an economical operation this volume will be obtained from good risk over-mature trees and from thrifty overstocked groups through selection thinning. Data gathered to date indicates that the average cut on a risk marking basis will amount to approximately 3 M feet b.m. per acre for Jeffrey pine type and approximately 5 M feet b.m. per acre for Jeffrey pine-fir type, and that few areas will require additional cut volume.

Christmas tree cutting will be based on the following guiding rules:

1. In Jeffrey pine-fir type, cut any usable tree when cutting will release Jeffrey pine reproduction.
2. In all types no cutting will be done when stocking is below normal.
3. In all types when stocking is greater than normal, cut usable and sufficient unusable trees to improve the rate and quality of future growth.

A modified system of slash disposal will be practiced on the entire area. This will consist of complete lopping plus piling and burning of strips. A slash disposal plan will be prepared for each sale area prior to cutting and will include the specific location and extent of slash disposal.

The entire area is well suited to tractor logging and truck transportation. This method will be used over the entire area.

Planting of burns will be the minimum planting requirement. Other areas will not be planted in the immediate future. Both the quantity and quality of timber growth on this area is below average, for the east side of the Sierras. It is considered to be economically unsound to invest time, money, and effort in large scale plantings for sawtimber production. Planting for Christmas tree production is considered to have economically sound possibilities. Plantings of this type will be on an experimental basis.

In general, stands of this area are open grown and not over-stocked. Thinning will be on an economical self-sustaining or on an experimental and demonstrational basis.

Timber of this area grows open and short with persistent limbs extending generally within a few feet of the ground. Large scale pruning will be done on the better sites after cutting. Pruning will conform to regional standard practices. Advantage will be taken of the Knutsen-Vandenburg Act to collect funds for this work. K-V collections, for this purpose, will be made on all sales.

The removal of large defective unmerchantable fir trees represents a major stand improvement problem in both pure fir types and mixed pine-fir types. These trees will be cut and disposed of to the greatest possible extent in connection with the cutting of merchantable timber. Where the volume of defective trees (trees so defective that they are unmerchantable) is so great that it will be impracticable to cut all at the time of logging it will be the policy to cut only those defective trees containing merchantable materials, leaving the completely cull trees standing until the slash hazard has returned to normal. K-V funds will then be used to complete the felling of the remaining defective trees.

The felling of all snags is most desirable. It will be the policy to fell all snags either in conjunction with the felling of merchantable material or within thirty days after logging has been completed on any area.

The two measures considered to be most effective in protection against insect and disease infestations are: (1) the removal from the stand of trees most susceptible to insects and disease through risk marking as previously outlined; and (2) an order of cutting which gives major consideration to the area by area extent of insect and disease infestation and susceptibility. The above two measures will be used in planning the cutting in this Working Circle. Unforeseen future developments may require additional emergency protective measures.

A major factor controlling the survival of seedlings and to some extent influencing sawtimber quality is that of porcupine damage. The extent of recent damage is both widespread and intensive. A recent limited survey of porcupine damage indicated that on some areas 50 percent of the stand under 20 inches in diameter had been damaged or killed. A study will be made to determine the areas for control of porcupine and a program set up to complete control work.

Timber stand improvement plans will be prepared for each logging unit prior to making sales from the unit.

Silvicultural studies basic to good timber management and to be made for this area include the following:

1. A sample pruning study and demonstration area.
2. A sample planting study and demonstration area.
3. A sample Christmas tree plantation on a good site.
4. Continuation and expansion of the permanent sample plot growth studies.
5. Continuation of the Bureau of Entomology's seasonal insect survey.
6. An intensive study of porcupine damage.

The Semi-Merchantable to Unmerchantable Sawtimber Producing Area: This is the unallocated sawtimber producing portion of the Working Circle. It includes the poor quality scattered Jeffrey pine and fir within the Mono-Owens Block exclusive of the recreation areas, the lodgepole pine stands within the Mono-Owens Block exclusive of recreation areas, the scattered Jeffrey pine and the lodgepole pine types within the Glass Mountain Block, and the scattered pine type within the Round Mountain Block.

The primary use of these stands is that of sawtimber production, secondary uses will include the use of logging refuse for minor timber products and the cutting of Christmas trees in types containing red or white fir.

Silvicultural measures on the unallocated area will be the same as those for the allocated area.

The Fuelwood Producing Area: This is the unallocated fuel wood producing pinion pine type of the Working Circle. It includes all the pinion pine type within the non-recreation portions of the Mono-Owens Block and all the pinion pine type within the Glass Mountain and Round Mountain Blocks. The primary use of this area is the production of fuel wood. Secondary uses include the collection of pine nuts and other minor forest products.

Cutting will be confined to overmature and dead trees (tree classes "C" and "D" as defined by the study of pinion pine on the Mono National Forest by Earl Thomas in 1943).

The Recreation Areas:

1. The High Sierra Wilderness Area: This area includes portions of the headwaters of the following creeks and their tributaries: Mammoth, Sherwin, Laurel, Convict, McGee, Hilton, and Rock Creeks.

The primary use of this area is that of recreational and allied uses. Secondary timber uses will be confined to salvage cutting of diseased or insect-infested timber and authorized power and water development cuttings.

2. The Indiana Summit Natural Area: This area set aside as a pure Jeffrey pine natural area includes all or parts of Section 5, 6, 7, and 8, Township 2 South,

Range 28 East, M.D.M. The primary uses of this area are for research and as a practical demonstration area for all forest uses including timber management, range management, wild-life management, and related uses. No cutting of any kind is planned for that area at the present time.

3. The Mammoth-Rock Creek Recreation Area: This recreation area includes that portion of Mammoth Creek, Sherwin Creek, Laurel Creek, Convict Creek, McGee Creek, Hilton Creek, and Rock Creek outside of the High Sierra Wilderness Area and west of Highway 395.

The primary use of this area is that of yearlong recreational and allied uses. Secondary timber uses will include salvage of necessary insect or disease protective cuttings, salvage of necessary recreational development cuttings, the cutting of Christmas trees from overstocked fir reproduction stands where such cuttings are not in conflict with present recreation use, and the cutting of fuel wood from overmature pinion pine stands.

"Park Treatment" disposal of timber will be carried out for all necessary cutting of sawtimber in this area. This will consist of felling at ground level and the complete disposal of all slash resulting from cutting within areas visible from roads or trails, and an absolute minimum of removal and disposal damage.

A study of the practicability of planting on potentially valuable recreation sites on the basis of increasing recreational values and public educational values will be made for this area.

4. The Highway Scenic Strip Area: This area includes a strip of 300 feet of the seen area along either side of U.S. Highway 395 and along either side of the Big Springs Road between Highway 395 and the landing field. The primary use of these strips is scenery and related aesthetic values. Secondary use will consist of the salvaging of "poor risk" trees.

"Park Treatment" will be used in the salvaging of the "poor risk" trees, including skidding away from the Highway, and the cleaning up of landings which are within view of the Highway.

A well-posted pruning area will be made in the thrifty young stand of Jeffrey pine between Dry Creek and Deadman Creek within this strip. A sample planting plot will be made on the deep-soiled sagebrush area adjacent to Deadman Creek. This area is at present being slowly invaded by scattered thrifty Jeffrey pine.

5. The Upper Owens River Recreational Area: This is a potentially high value recreational use area including a strip approximately one quarter mile in width on either side of Glass Creek, Deadman Creek, and that portion of the Owens River above Clark Canyon. The future primary use of this area will undoubtedly be that of recreation and allied uses. Secondary and present compatible uses should be confined to "poor risk" cutting and cuttings necessary for recreational development.

An intensive insect, disease, and porcupine control program will be carried out on the recreation areas. Disease and insect infestations are at present endemic in general in all species on these areas. Porcupine damage

is at present widespread and intensive on these areas. Control of porcupines will be correlated with their control on the allocated and unallocated areas.

REGULATION

The Rotation: No rotation period is calculated for the Working Circle. Previous study has indicated a rotation age approximating 140 years to 175 years to be desirable for this area. Cutting subsequent to the first cut will be based on the net volume growth. This will necessitate the accurate determination of the net growth over the entire Working Circle.

The Cutting Cycle: A cutting cycle of twenty years is chosen for the first cut of the allocated timber from the Working Circle. This is the length of time determined to be the maximum effective period for risk-marked salvage cutting. The allocated cut for the Working Circle is now committed on a standard marking basis through existing sales and exchanges for approximately the next four years. This will leave approximately 16 years of risk-marked cutting during the first 20-year cutting cycle. This 16-year risk marking period is considered to be a conservative effective period for the salvage of dying and high risk timber from the Working Circle.

The Allowable Cut: On the basis of a 20-year cutting cycle, a 55% cut on existing sales and exchanges, an average 3 M feet b.m. per acre cut on risk-marked Jeffrey pine type, and an average of 5 M feet b.m. per acre cut on risk-marked pine-fir and fir types, the allowable average annual cut from allocated timber then can be determined as follows:

Item	Acreage	Basis of Cut	Volume to Cut
4/14/45 Exchange	4000	55% Standard	17,500 M feet b.m. 9 MM
Gov't pine type	24,040	3 M/A Risk Mark	72,120 M feet b.m. 3.5 MM
Gov't pine-fir & fir type	7920	5 M/A Risk Mark	39,600 M feet b.m. 2 MM
TOTAL	35,960		129,220 M feet b.m.

Then 129 MM feet b.m. divided by 20-year cutting cycle - 6.4 MM feet b.m. or, rounded off, equals 6 MM feet b.m. per year, the average allowable cut from allocated timber for the first cutting cycle.

In addition there is an estimated total stand of 235 MM feet b.m. of unallocated sawtimber within the Working Circle. On the basis of a standard marking practice and a cut of 50 percent, a cut of 118 MM feet b.m. will result from a complete cutting. Based on a 20-year cutting cycle, this will give an average allowable annual cut of 5.9 MM feet b.m. or 6 MM feet b.m.

The total allowable cut for the entire Working Circle then becomes:

Allocated timber - - - - - 6.0 MM feet b.m. per annum
 Unallocated timber - - - - - 6.0 MM feet b.m. per annum

Regulation Policy: It shall be the policy of the Inyo Forest to discourage any

increase in sawmill capacity dependent upon this Working Circle.

It shall be the policy of the Inyo Forest to make available for sale or exchange allocated timber in such quantities as will average the allowable cut of allocated timber for the Owens River Working Circle and in addition to make available for sale or exchange unallocated timber as requested in amounts not to exceed the allowable annual cut of unallocated timber.

Sales Policy: It shall be the policy of the Inyo Forest to make sales and exchanges of timber insofar as is possible from those areas of greatest value losses. This will salvage areas of heavy insect infestation, disease infection, wind throw, etc.

It will be the policy of the Inyo Forest to make exchanges of timber for desirable lands for administrative purposes.

The Cutting Budget: The following cutting budget for the next five-year period is suggested:

- 1948 - 6 MM from the 4-14-45 Inyo Lumber Company Exchange plus unallocated timber as requested.
- 1949 - 6 MM from the 4-14-45 Inyo Lumber Company Exchange plus unallocated timber as requested.
- 1950 - 5½ MM from the 4-14-45 Inyo Lumber Company Exchange plus unallocated timber as requested.
- 1951 - 6 MM from a new sale or exchange area.
- 1952 - 6 MM from a new sale or exchange area.

ADMINISTRATIVE CORRELATION

Acquisition and Exchange: The consummation of the Inyo Lumber Company 4-14-45 exchange agreement will place in government ownership all major tracts of sawtimber producing land within this Working Circle.

Smaller private tracts of value from a timber management point of view include 800 acres of Wedertz (now Inyo Lumber Company) land in the Mono Mills area, 200 acres of Hess land on Deadman Creek, 320 acres of Summers land on the Minaret Summit road and 80 acres of Hess land near the Owens River Gorge.

Acquisition of grazing lands is of value from a grazing administration standpoint because the private grazing lands in general control range water and key areas. Government ownership of these key areas is a necessary prerequisite to good range management.

Acquisition of privately owned recreation lands is of major administrative value in many of the high value recreation areas of the Forest.

The exchange of timber for private timberlands, private grazing lands, and private recreation lands either inside or outside the Working Circle will be encouraged to the greatest extent possible and will be correlated with the Inyo land acquisition program.

Grazing: At present there is very little conflict between grazing use and timber use in the Working Circle. This multiple use of timbered lands is both compatible and desirable in this open-grown timber-browse-grass combination. Conservative grazing is not injurious to timber reproduction in this area. Timber cutting is often beneficial to the grazing, particularly in the bitter brush-bunchgrass range types. No major timber use-grazing use problems are anticipated in the Working Circle.

Recreation: Recreation and allied uses are in direct conflict with sawtimber production on a large portion of the timber producing lands west of U.S. Highway 395. The area offers practically all forms of both winter and summer outdoor recreation and is fairly accessible to Los Angeles and other large centers of population. In view of the present trend toward increased outdoor recreation and transportation developments, it is considered in line with proper land and timber management that valuable recreational areas be administered for this primary use. Commercial cutting of sawtimber during the first cutting cycle will be confined to the cutting of poor risk trees. During this period use values will be studied and detailed correlated timber use adjustments consistent with existing and potential values will be made for recreation areas within the Working Circle.

Road Development: Road development can be accomplished at relatively low cost on the gentle sandy slopes of the merchantable timbered areas of the Working Circle. In general the primary logging roads required to log the allocated stands are already in existence. Correlation of primary logging road development with other administrative road needs is, therefore, of minor importance. Secondary logging road development in allocated timber areas and all logging road development in unallocated areas should be correlated with forest protection and administration needs. In line with this, Forest Service constructed all-purpose roads would, in some cases, be desirable.

Fire Protection: The major need for correlated fire protection measures exists in sawtimber producing stands adjacent to high value recreation areas and adjacent to high value recreation areas and adjacent to heavily used roads. Intensive hazard reduction, better communication facilities, and increased protection now contemplated for this area should adequately fulfill this need.

Additional fire protection measures now contemplated and partially in effect include more intensive hazard reduction adjacent to heavily used and high value areas, more effective closures of logging areas, a Forest owned telephone system connecting the Bald Mountain Lookout and the Mammoth Ranger Station, an improved radio communication system, additional fire equipment within and adjacent to the Working Circle, and additional suppression crew members stationed at the Mammoth Ranger Station.

Wildlife and Game Management: Little conflict between timber management and wildlife and game management is anticipated on this Working Circle since timber cutting has little effect on grazing or on soil erosion. The closure of logging areas will have only a slight effect on hunting during a portion of the hunting season.

Water Power Development and Watershed Protection: Little conflict between timber management and water power development and watershed protection is considered likely in this area. In general, streams of major potential power development do not exist in this area other than the Owens River and Rock Creek below Crowley Lake. Light cutting in the open stands of timber of this area will undoubtedly have but little effect on either streamflow or soil erosion.

A P P E N D I X

Detailed Timber Estimates by Townships:

The merchantable timbered area of the Working Circle has not been broken down into logging units for management purposes as little value would result from such a breakdown. Logging units are of very limited value on this area of relatively uniform topography.

The following timber estimates are consistent with the original method of compilation for the merchantable portions of the Mono-Owens Block. Volume estimates of lands cutover subsequent to the original compilation and volume estimates of recreation areas have been excluded from the estimates here shown.

TOTAL STAND OF GOVERNMENT ALLOCATED TIMBER BY TOWNSHIPS IN MBM						
Merchantable						
Township	Acreage	J.P.	W.W.P.	W.F.	R.F.	TOTAL
T.1S.,R.27 E	2,200	14,702	--	--	--	14,702
T.1S.,R.28 E	4,120	25,312	--	--	--	25,312
T.1S.,R.27 E	9,920	86,090	33	882	1,648	88,653
T.2S.,R.28 E	4,240	34,430	--	467	1,248	36,145
T.3S.,R.26 E	420	63	139	--	9,698	9,900
T.3S.,R.27 E	9,340	23,365	1,528	3,341	43,606	71,840
T.3S.,R.28 E	5,720	35,058	--	250	--	35,308
TOTAL	35,960	219,020	1,700	4,940	56,200	281,860

It is considered impossible at this time to forecast with any reasonable degree of accuracy the exact conditions of timber sales or timber exchange demands or the severity and extent of major timber deteriorating agencies such as insects, fire, etc., for any extended future period beyond the fulfillment of the existing sale and exchange cutting period. For this reason, it is considered consistent with good management practice that future sales and exchanges be made from those stands in which timber value losses are the greatest at the particular time and that timber estimate needs for individual areas be met by referring to the original field data now on file in the Supervisor's office rather than making the attempt at this time to predetermine the order and exact areas of future culling in this uniformly overmature block of timber.

Growth Data

During the 1945 field season a system of permanent silviculture study plots was started on the Mono-Owens Block of timber. These permanent plots are primarily designed as increment and loss study plots but can readily serve as sample study areas for other purposes such as utilization studies, cut and leave sample, porcupine damage studies, natural reproduction studies, risk marking check plots, etc.

These permanent plots are one-acre circular plots mechanically located in the center of each forty which touches either a section corner or a quarter corner. The center of each plot is designated by a painted iron pipe. All trees are

measured, marked and recorded as follows:

Leave trees 11.6 inches and greater in diameter.

Height - measured with a Biltmore stick to the nearest full 16-foot log.

Diameter - measured at $4\frac{1}{2}$ feet above the ground, marked with a white paint stripe where measured and recorded to the nearest one-tenth inch.

Number - numbered with white paint.

Boring - increment boring taken at D.B.H. including at least the last 20 annual rings.

Class - species, Dunning's crown class, and insect risk class is recorded for each tree.

Site - at least one tree per plot is bored to the pith and measured with Abney level and chain to the nearest foot total height.

Boring - the distance and direction from the center of the plot to two bearing trees are recorded for each plot.

Leave trees under 11.5 inches are counted and recorded by two-inch diameter classes by species.

Cut trees will be measured and recorded the same as leave trees when the area has not been logged prior to establishing the sample plot.

Other Data: Timber type, percent of slope, aspect, type of soil, brush species, a count of marketable Christmas trees, a count of porcupine attacked trees, and losses subsequent to logging are recorded for each plot.

Increment is determined for each plot by determining the present volume of each tree from a local volume table, totaling the volume of all trees on the plot, and applying an average cull percent.

This gives the present net volume of the plot. The volume at the time of logging is then determined by subtracting diameter growth since logging as determined for each tree from increment borings, subtracting height growth in 16-foot logs since logging determining volume at time of logging for each tree, totaling the volume of all trees on the plot, and applying an average cull percent. The difference, then, between the present net volume and the net volume at the time of logging represents the increment subsequent to logging. The net increment subsequent to logging is then determined by subtracting losses since logging from this increment. The average net increment then becomes total net increment since cutting divided by the number of years since the area was logged.

Average Increment in F.B.M. Jeffrey Pine type					
Plot Number	Site Index	Number Trees	Increment per year	Loss per year	Net Increment per year
1	85	5	34.5	—	34.5
3	112	18	89.3	—	89.3
4	110	9	42.0	—	42.0
5	110	13	57.5	—	57.5
6	90	20	75.5	2.5	73.0
8	125	63	157.0	—	157.0
9	110	15	66.5	—	66.5
10	65	24	78.5	—	78.5
TOTAL	807	167	608.0	2.5	605.5
AVERAGE	101	21	76.0	.3	75.7

Average Increment in F.B.M. S.P.-Fir Type

Plot Number	Site Index	Number Trees	Increment per year	Loss per year	Net Increment per year
2	110	39	249.0	107.0	142.0
7	115	25	192.5	—	192.5
11	120	38	177.0	—	177.0
TOTAL	345	102	618.5	107.0	511.5
AVERAGE	115	34	206.2	35.7	170.5

In addition to the 11 plots mechanically picked, one hand-picked plot was studied. It was the intent of this study to determine the volume per acre of basal area that would culminate average annual increment on a given site. In other words to determine the point at which growth would level off because of overstocking. It was felt that information of this type might be used as a guide for determining the maximum volume of leave per acre.

The one-acre plot picked for this study contained 30 Jeffrey pine trees ranging in diameter from 25.1 inches to 42.3 inches and in height from four to six 16.3 foot logs. The site index at age 300 was found to be 132, better than average for the area. The oldest tree is about 250 years old and the present volume on the acre is 33,860 board feet. The plot is within the old Hess cutting area and although trees were cut adjacent to this plot, no trees were removed from the plot at the time of logging.

Average increment was determined for this plot by ten-year periods and annual increment then plotted over age. Growth was found to increase at a fairly uniform rate up to the time of logging adjacent timber. Since the logging of the adjacent area growth was found to make a decided jump. The plot was found to average 477.5 board feet average net increment during the twenty-year period following logging. Net growth for the ten-year period prior to logging averaged 351 board feet per year, and for ten years prior to that averaged 317 board feet per year. The present basal area of the plot was found to be 25,592 square inches and the basal area of the time of logging was 21,448 square inches.

Conclusions reached from the study of this plot are: (1) the removal of trees from the stand may in some cases, dependent upon slope and other factors, be reflected in the growth of trees 150 feet or more distant from the trees removed. (2) On sites with a site index of 130 or more supporting larger trees with a volume of approximately 30 M feet b.m. per acre or 25,000 square inches per acre, the average annual increment per acre may still be increasing even though the growth for some individual trees has culminated. (3) In view of this near maximum average growth per year of 477.5 board feet per acre on better than average Jeffrey pine site, the average of 61 board feet per acre per year for Jeffrey pine type as a whole would indicate a conservative estimate.

A very general rule has been worked out for predicting growth on cut-over land. When the sample data now available is applied to this rule, results are significant. The rule should be used with considerable reserve of present, however, since it is supported by very meager data. The rule of thumb is average growth per acre in board feet for the twenty-year period following logging equals site index at age 300 x basal area in inches ÷ by 10,000.

Opinions and Conjectures

It is the honest opinion of the writer of this paper that the above-plan is based upon far too little basic, down to earth, scientific data, knowledge, and understanding of this timbered area to serve as any long-term basis for good land use or sound silvicultural practices. In confirmation of this opinion it can be stated that the writer spent only a four-month field season within the area and only a portion of this time was devoted to preparatory study toward the management of this area.

It is noted with considerable interest that during the past forty-year period, two complete cruises and one partial cruise of the merchantable timber of this area have been made. These three cruises represent the expenditure of several man-years of labor and considerable expenditure of money. This gathering of basic timber management data is not criticized, but rather is compared to the gathering of equally if not more important basic silvicultural data on this same area during the same period. Existing records show only a very small proportionate amount of time and effort spent in the gathering of data basic to sound silvicultural practices and treatment.

It can be argued that the results of scientific research made by capable individuals on similar forest types can be applied to stands of this area. This, of course, is true within certain limitations. However, it is the conjecture of the writer that this stand is sufficiently different in ecological, silvicultural, and in fact in many environmental and hereditary characteristics, to warrant separate and special study.

In line with the above conjectural reasoning it is the idealistic view of the writer that sound silvicultural practices most beneficial to this area are dependent upon accurate local unbiased studies and determination of quality increment by tree classes, quality losses by tree classes, and increased or decreased quality increment tendencies produced by various silvicultural treatments. These tree classes might logically be divided by crown classes, risk classes, diameter classes, site classes, timber type classes, and others. The above studies would necessitate considerable expenditure of time and effort but within limits would more than compensate for the time spent by increasing future returns from timber resources. It is believed that good timber management practices based on adequate silvicultural knowledge could increase the value of timber goods and services produced on this area several fold. It can be pointed out that this timbered area would normally be among those areas first to become unmerchantable and economically submarginal during periods of poor lumber marketing conditions. In the interest of community stability during lumber slump periods, sound silvicultural practices are, therefore, in this respect more important in this area than in areas of better timber quality.

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PLANS

Timber Management-Inyo
Owens River Working Circle

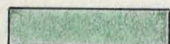
Map to accompany, "Timber
Management Plan, The Owens
River Working Circle, Inyo
National Forest," May 8, 1947
Louis R. Geil, Forester



W. C. Boundary



Block Boundary



Gov't. Merch. Sawtimber



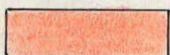
Gov't. Semi-Merch. to Unmerch. Sawtimber



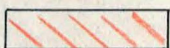
Gov't. Woodland Type



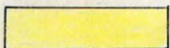
Gov't. Cutover



Inyo Lumber Co. Exchange Lands - Virgin



Inyo Lumber Co. Exchange Lands - Cutover



All other Ownerships



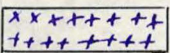
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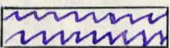
Indiana Summit Natural Area



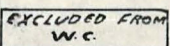
Mammoth - Rock Creek Recreational Area



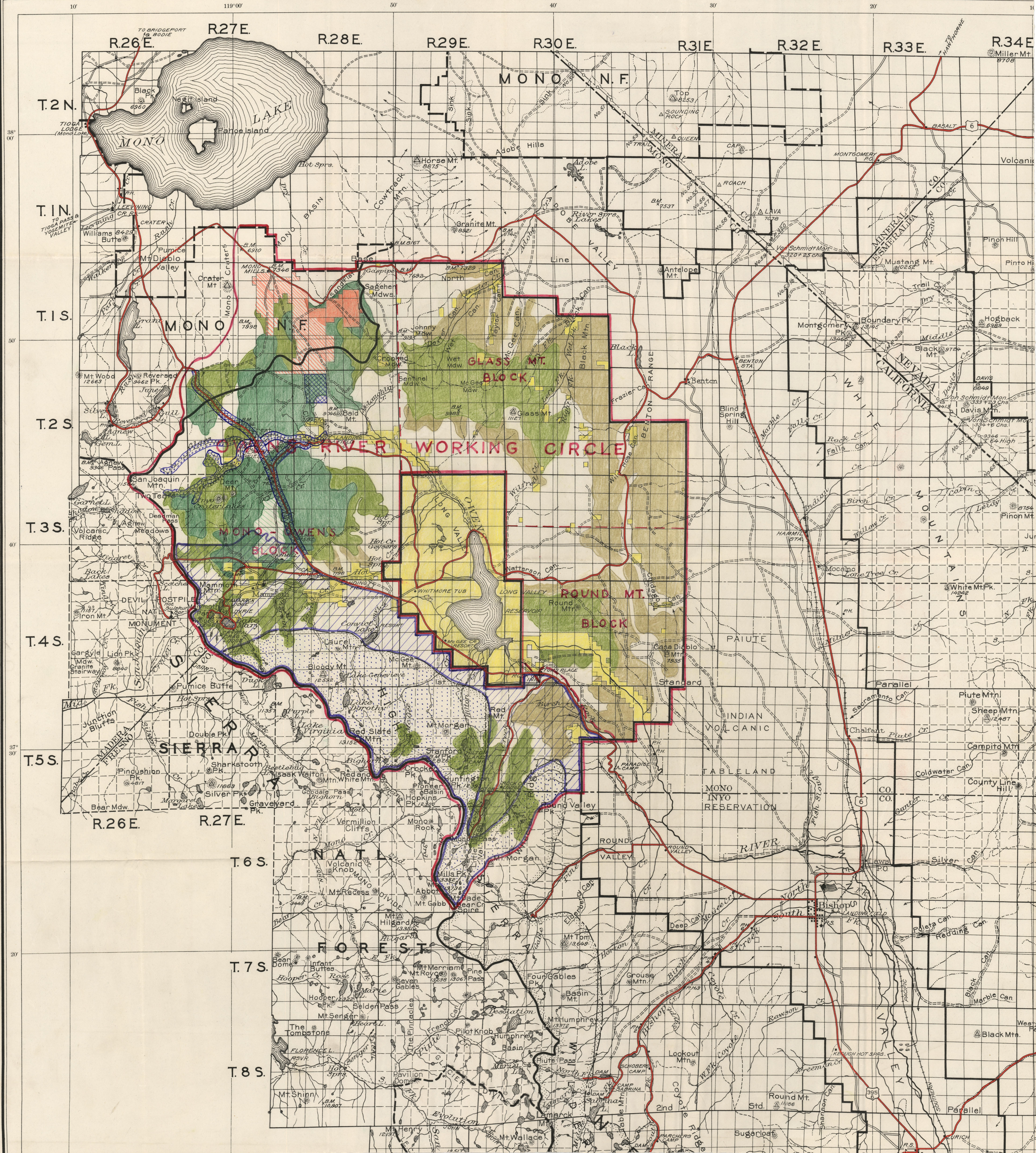
Upper Owens River Recreational Area



Highway Scenic Strip



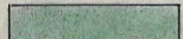
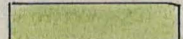
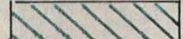
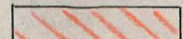
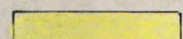
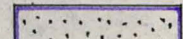
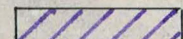
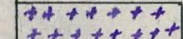
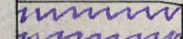
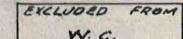
Reds Meadow Recreational Area



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PLANS
Timber Management-Inyo
Owens River Working Circle

Map to accompany, "Timber
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Louis R. Geil, Forester

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	Block Boundary
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	Gov't. Semi-Merch. to Unmerch. Sawtimber
	Gov't. Woodland Type
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	Inyo Lumber Co. Exchange Lands - Virgin
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